

**REMARKS**

Reconsideration of the above-identified patent application, as amended, is respectfully requested. No new matter has been added.

Claim 1 has been amended to recite that the core is ---fixedly--- attached to the jacket by casting it in molten form inside the solid jacket. Support for this Amendment is found at page 6, lines 6-12 of the Specification.

The Office Action objected to the Amendment filed November 29, 2002 for allegedly adding new matter to the disclosure, specifically, the use of the term "expanded" in place of "extruded," even though support is believed inherent in the term "upsetting." Correction has been required, and accordingly, the paragraph beginning on page 5, line 17 of the Specification has been amended to read ---extruded--- in place of the word "expanded." Support is found in this paragraph (beginning on page 5, line 17), as filed.

Former Claims 11-14 have been rejected under 35 U.S.C. §112, second paragraph as allegedly being indefinite for depending upon non-elected Claim 10. Claims 11-14 have been amended to no longer depend upon Claim 10. Accordingly, withdrawal of the rejection applied to former Claims 11-14 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite, is respectfully requested.

Former Claims 19, 14 and 22 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,647,358 to Bartsch ("Bartsch"), in view of U.S. Patent No. 3,648,757 to Willingham ("Willingham").

Claim 19 is directed to a method for manufacturing a suspension bar for a permanent cathode used in an electrolysis of metals, wherein the suspension bar is made of a

rigid metal outer jacket and a highly electroconductive inner part inside it, after which the outer jacket is removed at least from one end of the bar, wherein a refined steel outer jacket and a highly electroconductive core are in close contact with each other, wherein the parts of the bar are joined to each other by casting, and wherein in order to obtain a metallurgical bond between the jacket and the core, the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket.

Bartsch describes a current-feeding cathode mounting device for the electrolytic refining of copper that includes a permanent cathode and a hollow copper pipe that is placed inside a steel sheath. In the method of manufacture described by Bartsch, the outer jacket (the steel sheath) is initially split longitudinally. Later, the copper pipe is inserted into the sheath (2), and the sheath is welded closed. See Bartsch, column 2, lines 38-57 and column 3, lines 9-13.

Bartsch does not teach or suggest that “the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket,” as recited in amended Claim 19. If molten metal were poured into the split outer jacket of Bartsch, the molten metal would undoubtedly leak out and be wasted. Indeed, the Office Action states that “Bartsch does not disclose a method of joining the parts of the bar by casting.” See Office Action at page 3. Willingham does not remedy this deficiency.

Willingham describes making of multi-layer mold for iron pipe manufacturing. A mandrel 10, which has the configuration of the pipe to be cast, is first applied with a coating such as tin or lead to thickness of 0.0005 in. After that, a low-stress material such as nickel, copper or cobalt is electro-deposited on the coating. The electro-depositing is continued until a sleeve 15 is formed on the mandrel. The mandrel with the sleeve thereon is placed within a form 16, which

functions as a mold. A molten metal like aluminum, magnesium or the like is poured around the mandrel, between the mandrel and the form/mold (16) and allowed to harden to form an outer layer. See Willingham col. 3. lines 54-55, 63-64, 69-72. That is, Willingham describes forming the jacket onto the *outside* of a "core" by casting, and does not teach or suggest a core cast *within* a jacket, as claimed.

The Office Action maintains that "Willingham teaches a method of attaching the core to the jacket by casting it in molten form as shown in Figure 4." See Office Action at page 3, penultimate paragraph. According to the Office Action, "Willingham shows the jacket 16 and the core in molten form being poured into the jacket in Figure 6. Although the jacket 16 is removed from the core as shown in Figure 6, a metallurgical bond was formed because the core and the jacket are united in one solid piece as shown in Figure 5." See Office Action at page 6.

As mentioned above, Claim 19 has been amended to recite that the core is "fixedly attached" to the jacket. Moreover, Applicants submit that the claimed "metallurgical bond" is not taught or suggested by Willingham.

Even if the molten metal shown being poured in Figure 4 were said to be a "core," and the form (16) were said to be a "jacket," then Claim 19 would still define patentable subject matter over Willingham, since the molten metal that is poured in Figure 4 is temporarily held in place by the form/mold (16) which is then removed. See Willingham, column 4, lines 8-10. That is, the solidified metal (18) is detached from the form/mold (16). It is not "fixedly attached," as required by amended Claim 19. In sum, Willingham does not teach or suggest that "the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket," as recited in amended Claim 19.

Furthermore, there is no motivation to combine the single conductor current-  
feeding cathode-mounting device of Bartsch with the method of making a centrifugal casting  
mold of Willingham to result in the method of Applicant's amended Claim 19. Bartsch does not  
teach or suggest combining with a casting method, much less the casting method of Willingham.  
Willingham is directed to a mold for use in manufacturing cylindrical bodies, in-particular iron  
pipe. The Office Action states that it "would have been obvious to provide a method of attaching  
the core to the jacket by casting it in molten form in the combination as taught by Willingham in  
order to mold the core to jackets of varying shapes and sizes." See Office Action at page 3,  
penultimate paragraph. However, Bartsch and Willingham are directed to non-analogous art-  
Bartsch to a metal refining apparatus and Willingham to a casting method for casting pipe.  
Moreover, Bartsch does not teach or suggest a need to be able to adapt readily to jackets of  
varying shapes and sizes. Even if the teachings of Bartsch and Willingham were properly  
combinable, such a combination would not result in teaching or suggesting the method recited in  
Claim 19 for the reasons set forth above.

Since neither Bartsch nor Willingham, alone or in combination, teach or suggest  
each and every element of amended Claim 19, Applicant respectfully submits that amended  
Claim 19 defines patentable subject matter thereover. Since Claims 14 and 22 depend from  
Claim 19, they also patentably distinguish over Bartsch and Willingham. Withdrawal of the  
rejection applied to former Claims 19, 14 and 22 under 35 U.S.C. §103(a) as being unpatentable  
Bartsch, in view of Willingham, is respectfully requested.

Former Claims 11 and 12 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of U.S. Patent No. 3,780,555 to Balthazar et al. ("Balthazar"). Amended Claims 11 and 12 depend from Claim 19.

The deficiencies of Bartsch and Willingham have been set forth above. Neither Bartsch nor Willingham teach or suggest a method for manufacturing a suspension bar wherein "the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket." Balthazar does not remedy the deficiencies of these references.

Balthazar describes a method for preparing seamless pipes for nuclear power plants by centrifugal casting. The centrifugal casting system includes a casting die (13), a cylindrical tube, which is rotated and into which molten pipe metal is poured. The casting die is provided with a preheater (35). However, preheating of a casting die does not teach or suggest heating of the jacket before or during bonding with the core by casting the core in molten form inside the solid jacket, as recited in Claims 11 and 12, respectively, since Balthazar does not attempt to fixedly attach the die (13) with the pipe preform (37).

Balthazar does not teach or suggest a method for manufacturing a suspension bar wherein "the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket," as recited in amended Claim 19.

For these reasons, Applicant respectfully submits that Claims 11 and 12, as amended, define patentable subject matter over Bartsch, Willingham and Balthazar, alone or in combination. Withdrawal of the rejection applied to former Claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of Balthazar is respectfully requested.

Former Claim 13 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of JP 01180718 to Yamada et al. ("Yamada"). Claim 13 as amended depends on Claim 19.

The deficiencies of Bartsch, and Willingham in teaching or suggesting the subject matter of Claim 19 have been set forth above. Yamada does not remedy these deficiencies.

Yamada describes forming a duplex tube wherein the tubes are fitted to each other by centrifugally casting the inner tube inside the outer tube. After the inner tube is cooled, an induction heating device and a water shower are integrated and moved in an axial direction in order to tighten the connection between the tubes.

Yamada does not teach or suggest a method for manufacturing a suspension bar wherein "the parts of the bar are joined to each other by casting, and wherein in order to obtain a metallurgical bond between the jacket and the core, the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket," as recited in amended Claim 19.

For these reasons, Applicant respectfully submits that Claims 19, as amended, defines patentable subject matter over Bartsch, Willingham and Yamada, alone or in combination. Since Claim 13 depends from Claim 19, it also patentably distinguishes over Bartsch, Willingham and Yamada, alone or in combination. Withdrawal of the rejection applied to former Claim 13 under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of Yamada is respectfully requested.

Former Claims 15 and 16 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of U.S. Patent No. 4,807,688 to Beetle ("Beetle"). Claims 15 and 16 depend from Claim 19.

The deficiencies of Bartsch and Willingham have been set forth above. Beetle does not remedy these deficiencies.

Beetle describes a process for forming metal objects using a submerged mold. Beetle does not teach or suggest a method for manufacturing a suspension bar wherein "the parts of the bar are joined to each other by casting, and wherein in order to obtain a metallurgical bond between the jacket and the core, the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket," as recited in amended Claim 19.

For these reasons, Applicant respectfully submits that Claim 19, as amended, defines patentable subject matter over Bartsch, Willingham and Beetle, alone or in combination. Since Claims 15 and 16 depend from Claim 19, they also patentably distinguish over Bartsch, Willingham and Beetle, alone or in combination. Withdrawal of the rejection applied to former Claims 15 and 16 under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of Beetle is respectfully requested.

Former Claims 15 and 17 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of U.S. Patent No. 5,005,631 to Dwivedi ("Dwivedi"). Claims 15 and 17 depend from amended Claim 19.

The deficiencies of Bartsch and Willingham have been set forth above. Dwivedi does not remedy these deficiencies.

Dwivedi describes a method for forming a metal matrix composite body. In Dwivedi, a permeable mass preform body, such as slip cast silicon carbide, is placed into contact from its external surface with molten matrix metal like aluminum. During contact, the molten

matrix metal infiltrates the preform. The preform is in an upright position in the refractory vessel during the infiltration, but the perform body is not totally immersed into the matrix metal.

Dwivedi does not teach or suggest a method for manufacturing a suspension bar wherein "the parts of the bar are joined to each other by casting, and wherein in order to obtain a metallurgical bond between the jacket and the core, the core is fixedly attached to the jacket by casting it in molten form inside the solid jacket," as recited in amended Claim 19.

For these reasons, Applicant respectfully submits that Claim 19, as amended, defines patentable subject matter over Bartsch, Willingham and Dwivedi, alone or in combination. Since Claims 15 and 17 depend from Claim 19, they also patentably distinguish over Bartsch, Willingham and Dwivedi, alone or in combination. Withdrawal of the rejection applied to former Claims 15 and 17 under 35 U.S.C. §103(a) as being unpatentable over Bartsch in view of Willingham, further in view of Dwivedi is respectfully requested.

**CONCLUSION**

In light of the foregoing, applicant respectfully submits that Claims 1-3, 5-7 and 9-22 as amended define patentable subject matter over the cited art, alone or in combination. An early allowance of all claims is earnestly solicited.

Respectfully submitted,



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